

THE GENUS *MECHANITIS* FABR.,
(LEPIDOPTERA, ITHOMIINÆ)

By W. T. M. FORBES,

DEPARTMENT OF ENTOMOLOGY, CORNELL UNIVERSITY

The Cornell Entomological Expedition of 1919-1920 obtained an exceptionally good representation of this genus, which has been supplemented by material already in the University Collection, several species from the Schaus collection, through the kindness of Mr. Schaus, and material purchased from W. F. H. Rosenberg and Staudinger and Bang-Haas. Altogether, most of the recognized forms of *Mechanitis* are at hand. The collections of the United States National Museum, the American Museum of Natural History, and the Carnegie Museum, at Pittsburgh, have also been consulted, and have given opportunity to see a few more forms, and have demonstrated the range of variation with long series from various parts of South America.

There has never been a systematic study of the species and forms of *Mechanitis*, and no attempt at a key, nor examination of the structural characters. In the only revision of the genus, by Haensch in Seitz's "Macrolepidoptera of the World," the forms are not even divided into natural groups.

Mechanitis is one of a little group of genera of Ithomiinæ characterized in the male by the rudimentary fore tarsi, apparently four-branched (or even five-branched) Cu in the fore wing, Sc and R of hind wing closely parallel at the base, and lobed costa of the hind wing. In the female the same group is unique among the butterflies in having Sc and R not merely closely parallel, but actually fused, out to the middle of the cell; and Cu is apparently four-branched, as in the male. The three genera may be separated as follows:

Mechanitis: Male fore femur full as long as coxa, its tip normally lying in the groove between eye and thorax, or at most a little below the eye; cell of hind wing normally about three-fourths length of wing, with the discocellular markedly angled and transverse; female with Sc arising from cell near its middle, and spur of media attached to lower discocellular in fore wing.

Scada: Fore femur shorter than coxa, the tip when folded lying far below the eye; cell of hind wing two-thirds as long as wing, the discocellular erect and straight or moderately angled, and the upper long and longitudinal; female with Sc arising from cell near middle, and spur of media attached to middle discocellular or opposite M_2 . Small translucent species.

Sais: Fore femur as in *Scada*; cell with its apex reaching almost to margin, and obliquely cut off at end, mdcv. and ldcv. continuing the general line of Cu, and udcv. very short; female with Sc arising from cell near its apex, and cell shaped about as in male.

Heteroscada is synonymous with *Scada*, being based on males of *Scada* and females of *Episcada*.

On genitalic characters only two species can be separated from the general mass of the genus, *M. equicola* and *M. truncata*. I suspect *M. proceris* may also be structurally distinct, but have only a specimen without an abdomen. It is hardly conceivable that all the other forms are a single species, especially as frequently two or three are found in a single locality without intergrading, so I have grouped them as ten species in the following list, recognizing that the number may be reduced still more when the biology is known:

1. *equicola* Cr., with var. *equicoloides*.
2. *truncata* Btl., with varieties *juntana*, *olivencia* and *huallaga*.
3. *proceris* Weym.
4. *polymnia* L., with varieties *chimborazona*, *caucaensis* and *casabranca*.
5. *mazæus* Hew., with vars. *nigroapicalis*, *jurimaguensis*, *phasianita*, *lucifera*, *pannifera*, *fallax*, *messenoides* and *deceptus*.
6. *eurydice* Stgr., with var. *doryssides*.
7. *doryssus* Bts., with vars. *veritabilis*, *labotas*, *utenaia* and *saturata*.
8. *macrinus* Hew.
9. *lycidice* Bts., with var. *isthmia* and ab. *arcana*.
10. *franis* Hew., with var. *menapis*.
11. *mantineus* Hew., with an undescribed variety.
12. *elisa* Guer., with var. *ocona* and ab. *meneclis*.

13. *lysimmia* F., with vars. *nessaea*, *sulphurescens* and *albescens*.

I have a suspicion in particular that *polymnia*, *mazæus*, *dorysus* and *eurydice* are all one species, but the presence of *eurydice* in the same region with forms of *mazæus* makes a difficulty unless there is Mendelian inheritance. *M. lysimmia* appears to come closer to *elisa*, although Bates thought he had transitions to *polymnia*, and *M. macrinus* perhaps points more nearly to *lycidice*; *franis* and *mantineus* represent each other, and the specimen described below is perhaps an intermediate.

SUMMARY OF FORMS HERE RECOGNIZED AS SPECIES.

(Aberrant specimens are not allowed for in this table)

- A. Separate or nearly separate black postmedial bars on M_3 and Cu_1 ; R and M_1 of hind wing closely approximate in male (stalked in female?).
- B. Two costal spots on hind wing.....**equicola**
- BB. Without two costal spots on hind wing.
- C. Border of hind wing linear.....**truncata**
- CC. Border of hind wing of large black triangles containing white spots **proceris**
- AA. A black comma mark in cell M_3 , or the cell filled with black; R and M_1 of hind wing in male widely separated, in female not stalked.
- B. Postmedial pale spot in cell M_1 of fore wing transverse, frequently absent.
- C. Base of cell Cu_1 heavily black.....**elisa**
- CC. Base of cell Cu_1 of the pale ground color.....**lysimmia**
- BB. Postmedial pale spot in cell M_1 longitudinal, rarely if ever absent.
- C. Smaller, with somewhat translucent wings; red submarginal stripe of hind wing narrow and of almost even width.
- D. Ground normally yellow and heavily marked with black..
mantineus
- DD. Ground tawny at least over median area and more lightly marked with black toward base.....**franis**
- CC. Larger with opaque wings, median black band straighter, leaving a subterminal tawny area which is widest at the middle.
- D. Medial pale area and postmedial markings broadly connected.
- E. Black spot at lower angle of cell smaller than the one at upper**polymnia**

- EE. Black spot at lower angle of cell larger than the one at upper; base of wings frequently black...**mazaëus**
- DD. Postmedial band separated by black markings from the medial tawny area; lower spot at end of cell when recognizable larger than upper.
- E. Yellow postmedial spot in cell M_1 widely separated from the radial vein; black spot in base of cell Cu_1 small or absent**macrinus**
- EE. Postmedial spot in cell M_1 resting on the vein, and in contact with the postmedial costal spot; a large black triangle in base of cell Cu_1 .
- F. End of comma-mark connected to inner margin, cutting off a tawny anal spot from the yellow postmedial area**lycidice**
- FF. Ground color in cell Cu_2 continuous to anal angle, and without a sharp change in color.
- G. Outer end of postmedial yellow bar occupying the center of cell M_3 **doryssus**
- GG. Outer end of postmedial yellow bar occupying the lower part of cell M_3**eurydice**

Key to Forms

1. Hind wing with two large black subcostal spots, at middle and end of cell, sometimes obscure above in male (*equicola*).....2
1. Hind wing without two separate costal spots.....3
2. Hind wing with two separate series of spots on the disc.....
***e. equicoloides**
2. Discal and marginal bands partly fused into a patch.....
equicola (sylvanoides)
3. Fore wing with a black streak centering on outer part of Cu_1 , sometimes partly fused with a similar shorter streak on Cu_2 , forming a sort of comma-mark, which crosses both veins broadly....4
3. Fore wing without streaks centering on M_3 and Cu_1 , the space between these veins commonly filled with black, or with a comma-mark completely enclosed between these veins, female with R and M_1 not stalked.....7
4. Under side with conspicuous white marginal spots in black triangles on both wings; fore wing with only one rounded spot in middle of cell, and a faint dark shade toward base; upper side of fore wing largely yellow.....***proceris**
4. Under side with a linear black border, not containing white spots on hind wing; fore wing with a triangular spot in base of cell as

*Species marked with an asterisk are in the collection of Cornell University or my own collection.

- well as the spot at the middle, at least on under side; upper side usually with only a yellow postmedial band; female with R and M_1 stalked (*truncata*)5
5. Fore wing with a yellow postmedial fascia6
5. Fore wing with a yellow discal spot only.....**t. olivencia**
5. Ground of fore wing wholly brown or tawny.....***t huallaga**
6. Ground of fore wing deep red-brown, with heavy black markings***t. truncata**
6. Ground tawny, with light black markings.....***t. juntana**
7. Fore wing with the tawny or yellow postmedial fascia broadly connected with the tawny base.....8
7. Fore wing with postmedial light band or spots completely separated from the reddish (or yellow) base by a black fascia (sometimes with a yellow median band across the cell, or with the apex wholly black)19
8. Hind wing normally with a narrow median band; fore wing with upper spot at end of cell larger than lower, or with the band at end of cell broader at costa.....9
8. Hind wing almost always with a very broad median band, often fused with the black border; fore wing almost always with lower spot at end of cell larger than upper, or with a bar broader at the lower end (*mazacus*).....**13**
9. Fore wing typically with two separate spots at end of cell; black spot in base of cell M_3 very small, much wider than long (*polymnia*)10
9. Fore wing with a single bar across end of cell; spot in base of cell M_3 much longer than wide.....***doryssus** (light specimens)
10. Under side of hind wing in both sexes, and upper side in female without a black postmedial band, the band above very broad in the male; postmedial yellow band of fore wing much narrowed toward inner margin (Ecuador).....***p. chimborazona**
10. Hind wing with black medial band about alike in both sexes and as strong below as above; yellow band of fore wing about as broad at outer margin as near end of cell.....11
11. Ground dark red-brown, the apical streak very strong and contrasting; spot in cell normally triangular.....***p. caucaensis**
11. Ground tawny; subapical spot smaller, spot in cell rarely triangular12
12. Subapical streak distinct, at least below; hind wing without yellow fascia***p. polymnia**
12. Subapical streak absent; hind wing with a yellow stripe in cell***p. casabranca**
13. Fore wing with ground tawny to base, at least in cell.....14
13. Fore wing with base solidly black, or at most with slight red-brown streaks; hind wing all black except apex.....17

14. Hind wing with separate black postmedial and margin bands....15
14. Hind wing black, with a red stripe in cell and apical patch only16
15. Fore wing with apex solid black.....**m. nigroapicalis*
15. Fore wing with a narrow and sharply defined red-brown band in apex**m. mazæus*
15. Fore wing with a larger diffuse tawny subapical area, more or less shaded with yellow, and sometimes connecting below with the tawny median area, which also has some yellow scaling.....
**m. jurimaguensis*
15. Apical portion of fore wing suffused with red-brown.....
m. phasianita
15. Fore wing with postmedial band yellow and apical region marked with yellow†*m. lucifera*
16. Fore wing with apex solid black†*m. pannifera*
16. A yellow spot in apical region..... †*m. fallax* (?)
17. Two yellow submarginal spots, in cells M_3 and Cu_1 of fore wing*m. meterus*‡
17. Outer margin without pale spots.....18
18. Fore wing with a yellow postmedial fascia.....†*m. messenoides*
18. Fore wing all black and red.....**m. deceptus*
19. Fore wing light yellow along base of Cu , with red showing as a spot at anal angle only; hind wing with a narrow red submarginal band**mantineus*
19. Fore wing with base deep ochre or darker, the base of Cu not paler than the region at the anal angle.....20
20. Fore wing as a rule with a zigzag postmedial fascia, in any case with the yellow postmedial area in cell M_1 a longitudinal oblong, and that in M_2 , when present, much shorter and transverse; antenna mostly yellow21
20. Fore wing with an obliquely transverse pale postmedial fascia in cell M_1 , frequently continuous with a similar one in cell M_2 , or else wholly black postmedially, never with a zigzag postmedial fascia33
21. Spot in cell M_1 small, widely separate from the costal postmedial spot when that is present, and well separated from the stem of R ; no postmedial yellow spot in cell M_2**macrinus*
21. Spot in cell M_1 in contact with that on the costa, being separated only by the black vein, almost always with a transverse spot in cell M_2 also22

‡I have entered this species where it would run in the key. I very much doubt if it is a *Mechanitis*.

†Species marked with a dagger have been examined in American collections.

22. A small rounded black spot in base of cell Cu_1 or none; hind wing with broad and subequal postmedial and marginal black bands, with a narrow and even red stripe between them, or with outer part of wing wholly black (*franisi*).....23
22. A large triangular black area in base of cell Cu_1 , usually leaving a squarish yellow or more rarely reddish spot in the middle of that cell; hind wing normally with black border slender, preceded by a reddish area which is broadest at the middle.....24
23. Hind wing with separate discal and marginal black bands.*f. *franisi*
23. Hind wing with outer half solid black.....*f. *menapis*
24. Marginal and postmedial light areas in cell Cu_2 separated by a complete black bar, extending down from the comma-mark or from the black filling of the outer part of cell Cu_1 to the black inner margin, rarely with vein Cu_2 narrowly red; border of hind wing even and commonly linear, in the male a third as wide as the discal band, which is often obsolete in the female; antenna mainly black (*lycidice*)25
24. Marginal and submarginal spots in cell Cu_2 broadly connected, normally both tawny; comma-mark distinct, connected to the black postmedial band but not to the inner margin; median fascia on hind wing about as broad as the black margin and alike in both sexes, the border often of white-centered black triangles.....27
25. Ground darker; postmedial band broken into spots; band below lower angle of cell often of two separate spots, or with the lower spot (below Cu_2) lost; band of hind wing of male commonly entering cell; female with apical region of fore wing two-thirds black, and a third or less yellow.....*l. *isthmia*
25. Ground paler; postmedial band of both sexes complete; spot at lower angle of cell large, complete, crossing Cu_2 ; band of hind wing not entering cell; female with apical half of fore wing nearly half yellow*l. *lycidice*, 26
26. Cell of hind wing of male with a little yellow, of female all tawnytypical form
26. Cell of male wholly yellow, of female with considerable yellow....
form *arcana*
27. Male antenna with only apical third yellow; fore wing beneath with outer end of the yellow postmedial band pointing directly at the white terminal spot, or bifurcated and almost enclosing it; inner edge of black bar at end of cell waved. Fascia on middle of hind wing above slightly widened in male only....**doryssus veritabilis*
27. Male antenna mainly yellow, with basal third black.....28
28. Outer end of yellow postmedial band beneath pointing directly toward the white marginal spot, or bifurcate and almost enclosing it, when narrowed occupying upper part of cell; inner edge of the bar at end of cell oblique and nearly straight, border of hind wing

- normally nearly even. Male with fore wing less than four-tenths as wide as long (*doryssus*).....29
28. Outer end of postmedial band pointing decidedly below the white marginal spot, the band when narrow occupying the lower part of the cell; inner margin of cell-bar irregular or sinuous. Male with fore wing more than four-tenths as wide as long (*eurydice*)....32
29. Ground deep ochre yellow, only apex of black discal band of hind wing preserved♀ form ***labotas**
29. Median band of hind wing practically complete.....30
30. Median band interrupted at the middle (Honduras).....**d. utenaia**
30. Median band complete, continuous (Guatemala to Costa Rica)..31
31. Postmedial yellow band of fore wing very narrow, normally less than half as wide as the dark ones before and beyond it; ground dark tawny***d. saturata**
31. Postmedial band and light markings generally, broader; ground lighter tawny***d. doryssus**
32. Fore wing with the pale spot in middle of cell Cu_1 yellow; hind wing with a strong yellow band in cell of male, and with some yellow in female.....***e. eurydice**
32. Fore wing with the quadrate light area in middle of cell Cu_1 largely or wholly tawny; hind wing without any yellow; ground darker brick red***e. doryssides**
33. Base of cell Cu_1 of fore wing wholly yellow or rarely with a small black dot; subapical pale spot broad and rounded (*lysinnia*)....34
33. A large triangular black patch filling the base of cell Cu_1 of fore wing, or cell Cu_1 mostly black with a yellow spot only (*elisa*)..37
34. Subapical spot yellow35
34. Subapical spot white36
35. With postmedial yellow dots at costa and inner margin..***l. nessæa**
35. No postmedial spots**l. sulphurescens**
36. Under side with a second irregular white submarginal spot below the subapical spot, the lower half of it showing on the upper surface also***l. albescens**
36. No such spot; the subapical spot occasionally edged on the inner side with a complete white band..... **l. lysinnia**
37. Fore wing with spot in cell Cu_1 overflowing into cell Cu_2 ; typically with an oblong postmedial band or bar between the costal and dorsal spots; and cell-spot crossing R.....***e. ocona**, 38
37. Yellow spot in cell Cu_1 crescentic or rounded, not crossing Cu_2 , cell-spot not crossing R; postmedial spots at costa and at inner margin only***e. elisa**
38. Yellow spots small, the one in cell Cu_1 accompanied by a separate satellite below Cu_2 ; hind wing without a median band above, with separate spots below**ab. *meneclis**
38. Yellow spots large, and spots in cells Cu_1 and Cu_2 broadly continuous; hind wing with a postmedial band.....***typical form**

NOTES

M. equicola (Cr.) Cramer's original figure of *Papilio equicola* shows plainly the single white marginal spots of a *Mechanitis*, not the double spots of a *Melinæa*, and also the characteristic broad zigzag yellow postmedial band and the two costal spots on the hind wing, of *equicoloides*. The postmedial and marginal black areas are almost completely fused on the hind wing, and so *sylvanoides* Godman and Salvin becomes a synonym. *Equicoloides* is a variant form, but perhaps worth a name. The male genitalia are characteristic, lacking the emargination at the apex of the valve, which is well-marked in *truncata* as well as the remaining species.

M. truncata Btl. This is also a well-marked species, both on pattern and genitalic characters. The truncation of the hind wing cited as the best specific character is confined to the male, and is difficult to appreciate, as in the typical group the hind wing is only a little less truncate. A better character may exist in the venation: in the female of *M. truncata* R and M_1 of the hind wing are strongly stalked, and in the male they are approximate at the origin and strongly curved; in the females of the *polymnia* group R and M_1 are separate or barely stalked while in the male they are well separated and only moderately curved. Males of *M. equicola* and *M. proceris* agree with *truncata*, but I have not seen females. In *truncata* also M_1 is stalked in the fore wing almost out to the origin of R_2 from the radial stem, in the *polymnia* group, it frequently is free, but the amount of variation is extraordinary. *M. truncata* differs from all the other species, apparently even from *M. proceris*, in the presence of two well-marked black spots in the cell of the fore wing, at least on the under side. The more basal one is triangular, the outer, which represents the spot present in other species, nearly round. The *polymnia* group are also separable by the black postmedial mark in cell M_1 being confined between the veins, unless the whole outer part of the wing is black, while in the other three species there are two separate or partially separate black bars centering on the veins. The species breaks into forms parallel to those of the *polymnia* group and easily confused with them. For instance

egaënsis Bates is a form of the *polymnia* group, while his var. B is typical *truncata*. I have received a dark specimen of form *juntana* as *fallax*, but the original description shows that name belongs in the *polymnia* group, and I have placed it doubtfully in the key.

The male genitalia are close to those of *polymnia*, but the gnathos is simple at its junction with the tegumen, and the valves are shorter and broader, with a heavier spur at their tips.

In some of the specimens of *M. t. juntana* in the Carnegie Museum the yellow is extended, almost as in *M. proceris*, but the hind wing pattern is distinctive, one aberration has the yellow replaced with gray.

M. proceris Weymer. This appears to be a good species, with the truncation of the hind wing even more exaggerated than in *M. truncata*. There is a similar form of *truncata* with an extended yellow area on the disc of the fore wing, but the lightly marked hind wing will easily separate it.

M. polymnia (L.). This is the oldest species of the genus, and typical of a large group of forms, which I have treated as six species, though I think there are fewer. For instance, there are specimens intermediate between *caucaënsis* and *veritabilis* in the Carnegie Museum, and others which resemble *veritabilis* save in the yellow antenna, from Venezuela. Bates also speaks of material from Central Brazil connecting *polymnia* with *nessæa*, though I have seen none. *Eurydice* and *doryssus* should perhaps be united even on present knowledge, as they seem to intergrade in Colombia, but *mazæus* also seems to intergrade with *polymnia*, and *mazæus* and *eurydice* certainly appear distinct.

Forms *polymnia*, *casabranca* and *caucaënsis* can hardly be kept separate even as varieties, as they fly together in most places to a greater or less extent, and the best one can say is that a given locality belongs predominantly to one or the other. I would credit typical *polymnia* to the Amazon basin as well as the Guianas.

M. mazæus Hew. The only form that I have taken in numbers is *M. m. deceptus*. I suspect that after all this may be a Mendelian form of *eurydice*, in spite of the striking difference in coloring due to mimicry of *Heliconius*. In light specimens (typical

mazæus) the arrangement of the spots is exactly as in *eurydice*, and they may possibly be hybrids. As things now stand it is best to keep the names separate.

M. eurydice Stgr. Hænsch associates this form with *lycidice* and *isthmia*, an obvious mistake, as it is the southern representative of *doryssus*, differing only in a small point of pattern. I have kept the name distinct, but have seen intermediates from Colombia. The form appears very rare in American collections, but was abundant in the Chanchamayo district, flying with the closely similar *Hirsutis neitha* in many cases, but tending a little more to keep in the shade.

M. jurimaguensis Stgr. This species when described was compared with *truncata*. A specimen received from Staudinger and Bang-Haas, is however a light form of the *mazæus* type and rather close to typical *mazæus*. It may be misdetermined, but the original description is inadequate, and the broad black bands on the hind wing mentioned in the description certainly do not point to a *truncata* form. The female of this form was sent to me as *metera* Hew. This is obviously incorrect, as *meterus* has quite a different wing-form according to the original figure, as well as pale marginal spots. I am almost certain that *meterus* is a *Ceratinia*, and probably a variety of *mansuetus* mimicking the same *Heliconius* group as *M. mazæus deceptus* and *Hyposcada fallax*.

M. macrinus Hew. This form is very close to the *polymnia* series on one side and to *lycidice* on the other. I suspect it is a form of *lycidice*, but as the distributions overlap I keep it separate. I have received a specimen with the yellow median area almost replaced by tawny, determined as *labotas*.

M. lycidice Bts. This form keeps perfectly distinct from the *doryssus* forms occupying the same areas, and is certainly as good a "species" as any in this series. I cannot see how Hænsch mixed it with *eurydice*. The various forms intergrade perfectly and each is highly variable, so that frequently a given specimen could be called by one varietal name as well as another. I have no data on *M. californica*. It is commonly credited to *M. l. isthmia*, which is the species Holland figures to represent the name.

M. mantineus Hew. This is in appearance the most striking perhaps of all the *Mechanitis*es, but in detail of pattern is not unlike the darker forms of the *polymnia* group. The translucency and the arrangement of the pattern on the hind wing point to a connection with *fran*is, and the following form, represented by a single specimen in the U. S. National Museum, is possibly an intermediate. As I should analyse the pattern it leans rather toward *mantineus* than *fran*is.

Antennæ yellow. Ground tawny; fore wing with yellow postmedial fascia very broad, the yellow area in cell M_3 being three times as long as broad, and the rest in proportion, completely cut off from the tawny base. Hind wing with a broad black border with *two* extensions inward in each interspace (unlike all the other *Mechanitis*-forms); postmedian fascia running well beyond cell and leaving a narrow red stripe of even width between itself and the border, much as in normal *mantineus* and *fran*is. Under side with large white marginal spots.

M. franis Reak. The translucent wings as well as the shape of the bands of the hind wing of the typical form connect this species with *M. mantineus*.

M. elisa Guer. This group of forms certainly seem to represent a species distinct from the *polymnia* series, flying together with *curydice* in Central Peru. I have no specimens as light as Hænsch's figure of *M. ocon*a, but have seen one in the Carnegie Museum from eastern Bolivia; Peruvian specimens certainly represent this form; *menecles* seems to be merely a name for dark specimens, and hardly worth distinguishing. I follow general usage in applying the name *elisa* to the southern race which I have from the provinces of Tucuman and Jujuy, Argentina.

M. lysimnia F. At first sight this species seems to represent *macrinus* in the south, but some specimens show plainly the postmedial band as an irregular series of white spots on the under side. In these specimens the spot in cell M_1 is clearly transverse, connecting the species with *elisa* rather than the *polymnia* group, as Bates imagined. I have seen nothing that by any stretch of imagination could be called an intermediate.

EXPLANATION OF PLATE XII.

1. *Mechanitis doryssus*, transitional to *polymnia*. Venation and pattern of male.

2. *M. eurydice*. Costa of hind wing of female.

3. *M. truncata hualлага*. Venation and pattern of male.

4. *M. truncata*. Costa of hind wing of female.

5. *M. eurydice*. Male genitalia.

A. Position of anal tube.

Æ. Position of ædæagus

J. Juxta

U. Uncus

V. Valve

Vi. Vinculum

6. Ædæagus of *M. eurydice*.

7. Left valve of *M. truncata juntana*.

8. Left valve of *M. equicola equicoloides*.

